Design and Implementation of Prototype of Underwater Submarine for Surveillance by Using GSM Technology

Shivani Jadhav, Prajakta Karape, Shweta Jadhav, Ashish Jadhav

B.E Students, Dept. of ENTC, SVERI's COE, Pandharpur, India

B.E Students, Dept. of ENTC, SVERI's COE, Pandharpur, India

B.E Students, Dept. of ENTC, SVERI's COE, Pandharpur, India

Asst. Professor, Dept. of ENTC, SVERI's COE, Pandharpur, India

ABSTRACT: In this journal, we have proposed design and implementation of prototype of underwater submarine for surveillance by using technology of GSM. This journal tells that how to control the submarine using DTMF technique.t Reliable surveillance is become a basic need of today's environment. Hence there is basic need to design system to be easy to handling, cost effective, efficient and should flexible for further improvement. The design which we have introduced that is underwater submarine is a one part of robotic system. By using simple mobile phone direction of submarine is controlled. Now remotely operated submarines are mostly needed in ocean applications. It becomes difficult for robots that are used in military technology to collect all information. Our cell phone operated submarine also one type of robot. The setup of submarine contains a wireless camera that transmits an actual video at the operators screen. The system consist of main blocks that are wireless phone that is mobile, microcontroller, DTMF receiver, wireless audio video camera, motor driver IC and battery for power supply.

KEYWORDS: GSM Technology, Arduino 2560, Search vehicle, Video transmission.

I.INTRODUCTION

Robotics inherently deals with things that move in the world. We live in the rovers on Mars, drones surveying the earth and self-driving cars. And, although specific robots have their subtleties, there are also some common issues we face in all of applications, particularly in state estimation and control surveillance in deep ocean areas where it is difficult to reach for human being is the major constraint for exploring under water movements of neighbour countries. This project will give a solution to the problem involved in such surveillance, because it is unmanned remotely controlled vehicle with live video transmission from submarine to remote mobile. In this we are using microcontroller, which can be programmed to control input and output modules interfaced to it. The controller makes use of drivers; depending on the indication the DC motors can be rotated. With the help of keypad operations will be done. Also mobile phone which will operate the submarine directions and the speed based on DTMF technology. Dual tone multiple frequencies depend upon the keypad tones whereas each tone can generate certain frequency, depending on that submarine will operate and it will increase or decrease the speed.

II.LITERATURE REVEEIW

The DTMF technology is associated with digital cell phones and gives two selected output frequencies (one high band of frequency and one is low band of frequency). The DTMF technique consist of 16 common alpha numeric characters (0-9, A-D, #) on the telephone. Each and every character is uniquely referenced by selecting one band out of the four low band frequencies which are associated with the matrix rows and coupled with selecting one of the four high band frequencies associated with the matrix columns [1].

In the article the underwater research vehicle is controlled by mobile which makes a video call to mobile phone attached vehicle. In the course of video call if any button is pressed a tone corresponding to button pressed is heard at other end of call. The tone is called DTMF tone. The vehicle receives this DTMF tone with the help of mobile phone placed in the vehicle. The processing of received DTMF tone is done by microcontroller with the help of DTMF decoder. The DTMF decoder IC will decode the received DTMF tone into its equivalent binary digit and these binary digits send to the microcontroller. The microcontroller is pre-programmed to take decision for any given input. Any mobile which makes a video call to the mobile phone stacked in the underwater research vehicle will acts as remote. So, this is simple robotic project which even does not require the construction of receiver and transmitter kits [2].

An autonomous underwater vehicle is an underwater vehicle capable of self-propulsion also known as underwater vehicle. It is a GSM device that is driven through the water by propulsion system, controlled by mobile. It controlled, operate and rotate through mobile [3].

Transmitter section is one mobile unit which is at far away distance. In transmitter section we press mobile keys which will acts as input for mobile placed in the boat. Depending on DTMF tone direction of boat can be controlled. GPS and GSM will be used to send the location of unspecified object [4].

III.PROPOSED BLOCK DIAGRAM

In the article the underwater submarine is controlled by mobile which makes voice call to the mobile phone attached to the vehicle. During the course of voice call if any button is pressed on remote mobile, corresponding to button pressed the tone is heard at other end of call this tone is called DTMF tone. The processing of DTMF tone is done by arduino MEGA microcontroller with the help of DTMF decoder. The microcontroller is pre-programmed to take a decision for a any given input. The microcontroller outputs its decision to motor driver to drive the motors in order to have forward or backward, dive in, dive out.
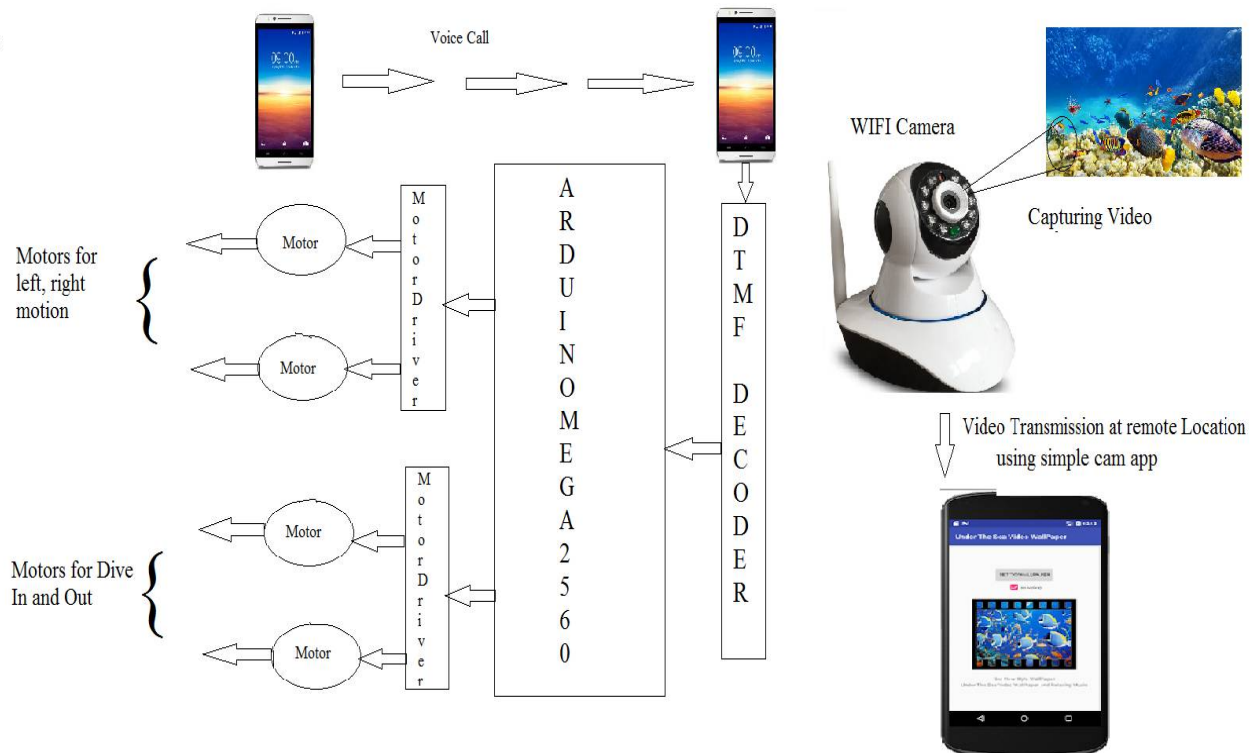

Fig.1: Block diagram of underwater submarine.

- **Remote Mobile:**
  The remote mobile is in operator's hand, which is used to send DTMF tone to the mobile connected to submarine.
- **Receiver Mobile:**
  It is used to receive the DTMF tone send by remote mobile.
- **DTMF Decoder:**
  DTMF decoder decodes the tone transmitted by remote mobile into its equivalent four bit binary number and send to the Arduino board. It acts as a intermediate device between Arduino and remote mobile to decode the tone.
- **Arduino2560:**
  Microcontroller takes input from DTMF decoder and processes the tone. The processed tone is given to motor driver which includes the action to be taken by motor driver. The Arduino is already programmed so that it will take a decision on any given input and also will outputs its decision to motor driver in order to drive the motors in forward, backward, left, right, dive in and out directions.
- **Motor Driver:**
  Two motor driver ICs can be used to drive four motors.

IV.FLOWCHART
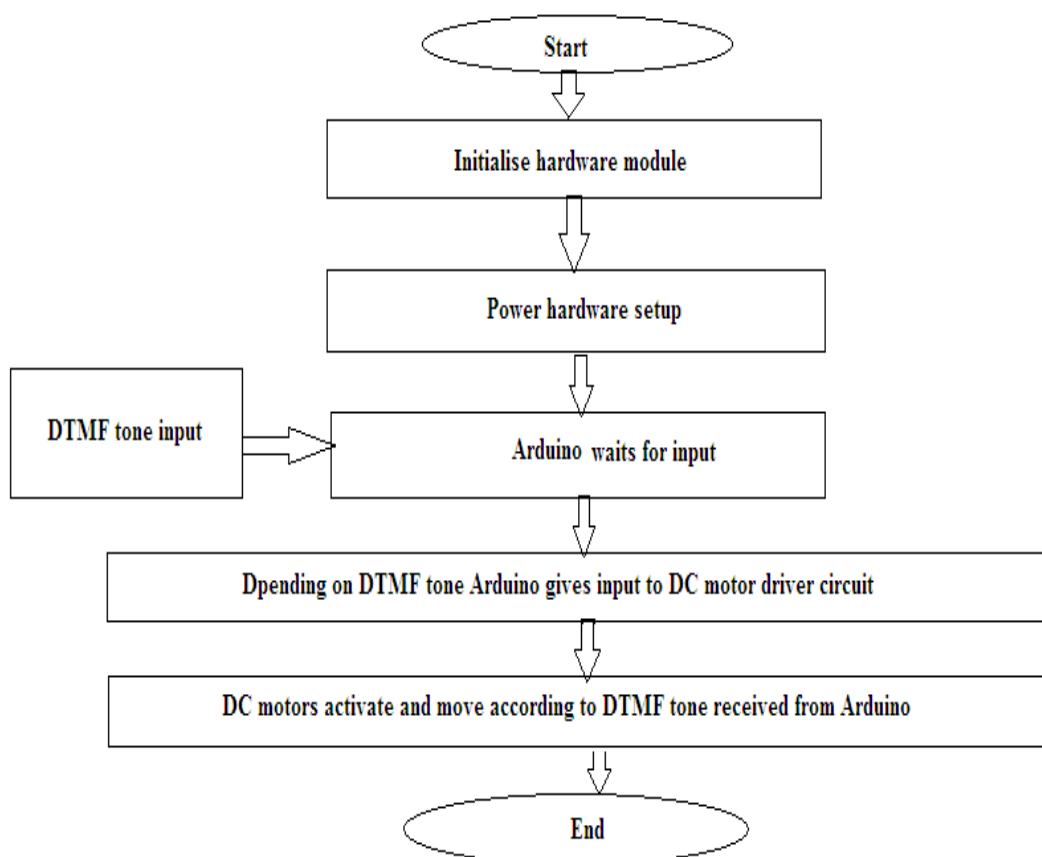
V.CIRCUIT SCHEMATIC

The first step of project implementation is starts with its design and real time simulation. Here are some results of different trials that taken while designing the circuit showing in Fig.2 for different key pressed. Simulation provides the environment for design entry and development. Simulation has proved user friendly and easy to use tool for PCB layout process. It has design error check and electric rule check tools which proved to be helpful in design. It has huge component list (library). Placement of component is also very easy and component can be rotated in 360 degree to adjust the design.
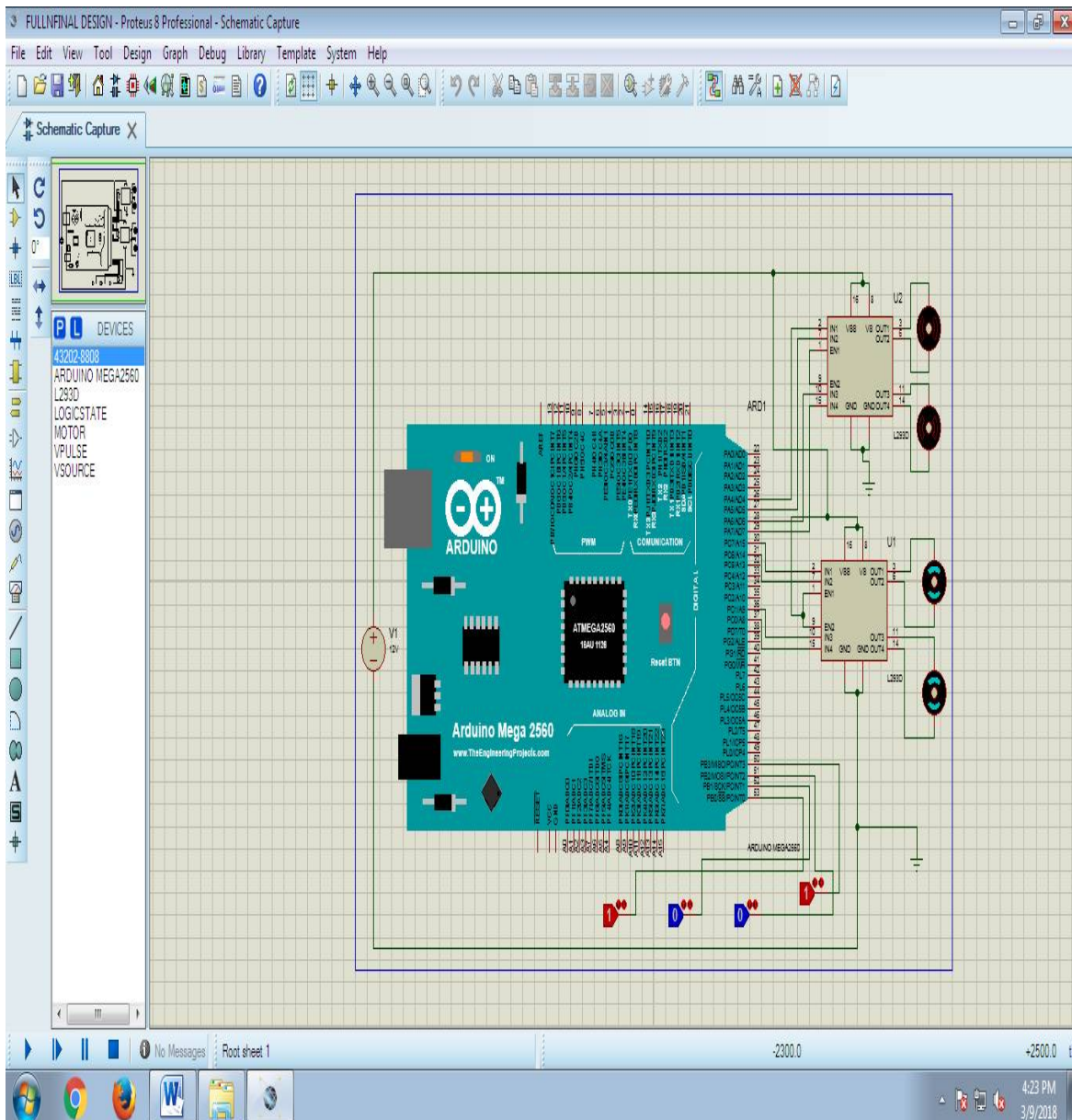

Fig.2: Simulation of circuitry.

VI.RESULTS

Hardware Result:
The model discussed above is a prototype of a submarine which gives us view of underwater marine lives by using DTMF and Wi-Fi technology.

Simulation Result:
As per the given input how the how the motors will move is shown in bellows table,

Key	D3	D2	D1	D0	Motion of motor
2	0	0	1	0	Forward
4	0	1	0	0	Left
6	0	1	1	0	Right
8	1	0	0	0	Backward
7	0	1	1	1	Dive in
9	1	0	0	1	Dive out
5	0	1	0	1	Stop

VII.CONCLUSION

The introduce cell phone operated surveillance submarine with wireless video camera which works on DTMF technology. This prototype is controlled by using a cellphone and its motion is done with the help of motors so it eliminates the need of fuel. This prototype is made up of weather resistant and water proof foam sheet which can be easily deployed in real time application. The video camera which is connected in this prototype transmits the live view of underwater lives.

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